

Claims

- [c1] A method of analyzing a printed image, comprising:
 - scanning the printed image;
 - determining spatial characteristics of the printed image;
 - statistically analyzing the spatial characteristics of the printed image;
 - determining spatial variations in the printed image based on the analyzed spatial characteristics; and
 - determining an image marking process used to create the printed image based on the determined spatial variations in the printed image.
- [c2] The method of claim 1, wherein spatial variations include local spatial variations of the scanned image data.
- [c3] The method of claim 2, wherein a low value of the local spatial variation of the scanned image data is indicative of a photographic image marking process or background noise.
- [c4] The method of claim 2, wherein a high value of the local spatial variation of the scanned image data is indicative of a halftone image marking process.
- [c5] The method of claim 1, wherein spatial variations include at least one of dispersion and periodicity.
- [c6] The method of claim 5, wherein a dispersed spatial variation of the scanned image data is indicative of an inkjet image marking process.
- [c7] The method of claim 5, wherein a clustered spatial variation of the

scanned image data is indicative of a xerographic image marking process or an offset image marking process.

- [c8] The method of claim 1, wherein spatial characteristics include at least one of halftone dot periodicity, halftone screen frequency and halftone screen noise.
- [c9] The method of claim 8, wherein a xerographic image marking process has low screen frequency and high screen noise characteristics.
- [c10] The method of claim 8, wherein an offset image marking process has high screen frequency and low screen noise characteristics.
- [c11] The method of claim 1, wherein scanning the printed image comprises dividing scanned printed image into image data blocks.
- [c12] The method of claim 11, wherein scanning the printed image further comprises selecting one or more image data blocks.
- [c13] The method of claim 1, wherein determining an image marking process based on the determined spatial variations comprises determining at least one set of data statistic for the scanned printed image.
- [c14] The method of claim 13, wherein determining at least one set of data statistic comprises determining one or more of an area average or mean of pixels in an image data block of the scanned printed image, an area variance of the pixels for the image data block, extreme minima value, \min_a , of the pixels for the image data block, extreme maxima value, \max_a , of the pixels for the image data block.

- [c15] The method of claim 14, further comprising performing data evaluations using the determined one or more data statistics.
- [c16] The method of claim 15, wherein performing data evaluations comprises one or more of determining a ratio of the area variance to mean determined for a given block, calculating a distribution of the mean values for large pixel areas, comparing the calculated mean value to the determined \min_a and/or \max_a values, and determining a distance between maxima/minima.
- [c17] The method of claim 16, wherein determining an image marking process comprises determining the spatial variations using histogramming based on one or more determined data statistics.
- [c18] The method of claim 1, wherein determining an image marking process is used to set color attributes for storage, transmission, transformation or reproduction.
- [c19] A method of determining an image marking process used to create a printed image, comprising:
scanning the printed image;
determining spatial characteristics of the printed image;
statistically analyzing the spatial characteristics of the printed image;
determining local spatial variations in the printed image based on the analyzed spatial characteristics; and
determining the image marking process used to create the printed image based on the determined local spatial variations in the printed image.

- [c20] The method of claim 19, wherein local spatial variations include dispersion and periodicity.
- [c21] The method of claim 19, wherein spatial characteristics include halftone dot periodicity, halftone screen frequency and halftone screen noise.
- [c22] The method of claim 19, wherein determining an image marking process based on the determined local spatial variations comprises determining one or more data statistics for the scanned printed image.
- [c23] The method of claim 22, wherein determining one or more data statistics comprises determining one or more of an area average or mean of pixels in an image data block of the scanned printed image, an area variance of the pixels for the image data block, extreme minima value, \min_a , of the pixels for the image data block, extreme maxima value, \max_a , of the pixels for the image data block.
- [c24] The method of claim 23 further comprising performing data evaluations using the determined one or more data statistics.
- [c25] The method of claim 24, wherein performing data evaluations comprises one or more of: determining a ratio of the area variance to mean determined for a given block, calculating a distribution of the mean values for large pixel areas, comparing the calculated mean value to the determined \min_a and/or \max_a values, and determining a distance between maxima/minima.
- [c26] The method of claim 19, wherein determining an image marking process

is used to set color attributes for storage, transmission, transformation or reproduction.

- [c27] A machine-readable medium that provides instructions for determining an image marking process used to create a printed image, instructions, which when executed by a processor, cause the processor to perform operations comprising:
- scanning the printed image;
 - determining spatial characteristics of the printed image;
 - statistically analyzing the spatial characteristics of the printed image;
 - determining local spatial variations in the printed image based on the analyzed spatial characteristics; and
 - determining the image marking process used to create the printed image based on the determined local spatial variations in the printed image.
- [c28] The machine-readable medium according to claim 27, wherein local spatial variations include dispersion and periodicity.
- [c29] The machine-readable medium according to claim 27, wherein spatial characteristics include halftone dot periodicity, halftone screen frequency and halftone screen noise.
- [c30] The machine-readable medium according to claim 27, wherein determining an image marking process based on the determined local spatial variations comprises determining one or more data statistics for the scanned printed image.
- [c31] The machine-readable medium according to claim 30, wherein

ning one or more data statistics comprises determining one or more of an area average or mean of pixels in an image data block of the scanned printed image, an area variance of the pixels for the image data block, extreme minima value, \min_a , of the pixels for the image data block, extreme maxima value, \max_a , of the pixels for the image data block.

[c32] The machine-readable medium according to claim 31 further comprising performing data evaluations using the determined one or more data statistics.

[c33] The machine-readable medium according to claim 32, wherein performing data evaluations comprises one or more of: determining a ratio of the area variance to mean determined for a given block, calculating a distribution of the mean values for large pixel areas, comparing the calculated mean value to the determined \min_a and/or \max_a values, and determining a distance between maxima/minima.

[c34] The machine-readable medium according to claim 27, wherein determining an image marking process is used to set color attributes for storage, transmission, transformation or reproduction.

[c35] A media/image marking process identification system for a printed page, comprising:

a memory; and

a media/image marking process identification determination circuit, routine or application that identifies at least one of a media type for the printed page or an image marking process used to process the printed page, by processing the printed page to determine spatial characteristics

of the printed image; statistically analyzing the spatial characteristics of the printed image; and determining local spatial variations in the printed image based on the analyzed spatial characteristics.

- [c36] The media/image marking process identification system according to claim 35, wherein local spatial variations include dispersion and periodicity.
- [c37] The media/image marking process identification system according to claim 35, wherein spatial characteristics include halftone dot periodicity, halftone screen frequency and halftone screen noise.
- [c38] The media/image marking process identification system according to claim 35, wherein determining an image marking process based on the determined local spatial variations comprises determining one or more data statistics for the scanned printed image.
- [c39] The media/image marking process identification system according to claim 38, wherein determining one or more data statistics comprises determining one or more of an area average or mean of pixels in an image data block of the scanned printed image, an area variance of the pixels for the image data block, extreme minima value, \min_a , of the pixels for the image data block, extreme maxima value, \max_a , of the pixels for the image data block.
- [c40] The media/image marking process identification system according to claim 39 further comprising performing data evaluations using the determined one or more data statistics.

- [c41] The media/image marking process identification system according to claim 40, wherein performing data evaluations comprises one or more of: determining a ratio of the area variance to mean determined for a given block, calculating a distribution of the mean values for large pixel areas, comparing the calculated mean value to the determined \min_a and/or \max_a values, and determining a distance between maxima/minima.
- [c42] The media/image marking process identification system according to claim 35, wherein determining an image marking process is used to set color attributes for storage, transmission, transformation or reproduction.